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JOHN W. LEWELLEN

OBJECTIVE

To obtain a position in a scientific or technically based organization where I may make full use of my experience and abilities.

AREAS OF EXPERTISE

- Experimental accelerator and free-electron laser physics
  - Electron source design, development and operation
  - Beam and accelerator control, optimization and analysis
  - Free-electron laser operation and optimization
- Related areas of familiarity
  - Fortran, shell script, Tcl/Tk programming; some c
  - Computer control of complex systems
  - Feedback and response control systems
  - High-peak-power CPA laser systems and optical beam transport
  - Computer simulation, including externally implemented optimization routines

PROFESSIONAL EXPERIENCE

1997 - 2002 Advanced Photon Source Argonne, IL

Assistant Scientist,(ANL grade 705) Jan 1997 – Mar 2002

Scientist (706), Mar 2002 – Jan 2003

Scientist (707), Jan 2003 – present

- Administrative & Management Positions

  Assistant Group Leader, Linac Systems, Mar 2002 – Jan 2003

  Deputy group leader, Jan 2003 – present

  APS Linac Manager, Nov 2002 - present
- Primary Research Projects
  - Core member, APS SASE-FEL commissioning & operations team
  - APS LINAC bunch compressor design, installation and commissioning
  - BNL-type photocathode rf gun modeling, operation and performance optimization
  - Advanced rf gun simulation, design and construction, including higher-order-mode and ballistic compression rf gun
  - SASE-FEL performance enhancement studies
  - Advanced SASE-FEL topics: study and facilities proposal
  - Advanced undulator and insertion device design and modeling
- Main Responsibilities – Assistant Group Leader
  - oversight of Injector Test Stand construction project
  - oversight of Physics Group LINAC-related activities, including free-electron laser and coherent synchrotron radiation studies

- Main Responsibilities – APS Linac Manager
  - oversight of the APS linac for storage-ring operational support
  - development of diagnostics tools and procedures for operational optimization, early fault detection, and redundant operation
  - planning of future upgrades and enhancements to fulfill the future requirements of storage-ring operational modes
  - interfacing with other groups and projects requiring the use of the APS linac
- Other Projects and Topics of Note
  - APS SASE-FEL research liason to the TESLA TTF-FEL experiment, Hamburg, Germany; participated extensively in personnel exchange program
  - Design, commissioning and implementation of the APS hot-spare main injector system
  - APS Main Injector Upgrade project specification and oversight
  - Storage ring top-up mode requirements studies and preparation for interleaving with APS SASE-FEL studies
  - General APS LINAC commissioning and upgrade for 4th-generation light source research
  - generation of Accelerator Physics Group and Division inter-group and inter-divisional interface document
  - charter member, APS Employee Advisory Committee

EDUCATION

1991 - 1997 Stanford University Stanford, CA

Ph.D. Applied Physics (R.H. Pantell, advisor)

- Small, compact, inexpensive free-electron laser design and construction
- High-efficiency free-electron lasers
- Advanced rf electron gun designs for compact FEL use

1987 - 1991 Case Western Reserve University Cleveland, OH

B.S. Physics, Suma Cum Laude

- Senior thesis research project in solid-liquid ^{4}He interfaces
- Minor: history of science and technology

PROFESSIONAL MEMBERSHIPS

American Association for the Advancement of Science
American Physical Society
Optical Society of America

REFERENCES

(available upon request)

PUBLICATIONS AND INVITED TALKS

Oral Presentations and Invited Talks

- "Injector Research at the APS," presented at Lawrence Berkeley Laboratory Center for Beam Physics, 4 October 2002 (invited talk).
- "The APS Main Injector System," presented at the Stanford Synchrotron Radiation

Laboratory, Palo Alto, CA, 1 October 2002 (invited talk).

- "Needle Cathodes for RF Guns," presented at the 2002 ICFA Beam Dynamics and Advanced Accelerator Workshop, Sardinia, Italy, June – July 2002.
- "Televisions to Tevatrons – Some Fundamentals of Accelerators," Accelerator Systems Division engineering seminar, Advanced Photon Source, September 2001.
- "Status and Recent Results from LEUTL: Characterization of the Saturation of the APS SASE-FEL," presented at the 2001 Free-Electron Laser Conference, Darmstadt, Germany (August 2001) (invited talk).
- "Ion Tracking in Photocathode RF Guns," presented at the ICFA Laser-Beam Interactions workshop, Stony Brook, June 2001.
- "RF Guns at the APS (and some related topics)," presented at the April 2001 Fermilab A0/NICAAD Workshop.
- "Status of the APS LEUTL FEL Project," presented April 2000, DESY, Hamburg, Germany.
- "A Flexible Bunch Compression System," presented at the ICFA Workshop, UCLA, Novemeber 1999.

Submitted and Pending Publication

- Y. Li et. al., "Time-resolved phase measurement of a self-amplified free-electron laser," accepted for publication in Physical Review Letters
- J.W. Lewellen, "Simulation of a Higher-Order Mode Photoinjector," to be published in the Proceedings of the LINAC 2002 conference, Gyongju, Korea
- J.W. Lewellen and C.A. Brau, "RF Photoelectric Injectors Using Needle Cathodes," to be published in the Proceedings of the 2002 Free-Electron Laser conference, Argonne, IL
- Y. Li et. al., "Time-Resolved Measurement of a 530-nm SASE FEL," to be published in the Proceedings of the 2002 Free-Electron Laser conference, Argonne, IL
- A.H. Lumpkin et. al., "Observation of z-Dependent Microbunching Harmonic Intensities Using COTR in a SASE FEL," to be published in the Proceedings of the 2002 Free-Electron Laser conference, Argonne, IL
- A.H. Lumpkin et. al., "Evidence for Transverse Dependencies in COTR and Microbunching in a SASE FEL," to be published in the Proceedings of the 2002 Free-Electron Laser conference, Argonne, IL

Published Works

- S.G. Biedron et. al., "The Low-Energy Undulator Test Line: A SASE FEL Operating from 660 to 130 nm," Proceedings of X-Ray Lasers 2002: 8th International Conference on X-Ray Lasers, pp. 357-364 (2002).
- J.W. Lewellen et al, "A Sampling of Recent Measurements at the APS SASE-FEL," Nucl. Instr. Meth. "A", 483, 1-2, pp. II-1 (May 2002)
- M. Körfer et al., "The TTF-FEL Status and its Future as a Soft X-Ray User Facility," Nucl. Instr. Meth. "A", 483, 1-2, pp. 34-9 (May 2002)
- V. Sajaev et al, "Z-dependent Spectral Measurements of SASE FEL at APS," Nucl. Instr. Meth. "A", 483, 1-2, pp. (May 2002)
- M.V. Yurkov et al., "Statistical properties of SASE FEL radiation: experimental results from the VUV FEL at the TESLA Test Facility at DESY," Nucl. Instr. Meth. "A", 483, 1-2, pp. 51-6 (May 2002)
- A.H. Lumpkin et al, "First Observations of Electron-Beam Microbunching in the Deep Ultraviolet at 265 nm Using COTR in a SASE FEL," Nucl. Instr. Meth. "A", 483, 1-2,

pp. 402-6 (May 2002)

- A.H. Lumpkin et al, "Comprehensive z-Dependent Measurements of Electron-Beam Microbunching Using COTR in a Saturated SASE FEL," Nucl. Instr. Meth. "A", 483, 1-2, pp. 394-401 (May 2002)
- M. Borland et al, "Start-to-End Simulation of SASE FELs from the Gun through the Undulator," Nucl. Instr. Meth. "A", 483, 1-2, pp. 268-72 (May 2002)
- S.G. Biedron et al, "Measurements of Nonlinear Harmonic Generation at the Advanced Photon Source's SASE FEL," Nucl. Instr. Meth. "A", 483, 1-2, pp. 94-100 (May 2002)
- J.W. Lewellen et al, "Present Status and Recent Results from the APS SASE FEL," Nucl. Instr. Meth. "A", 483, 1-2, pp. 40-45 (May 2002)
- B. Faatz et. al., "Alignment of the optical feedback system of VUV regenerative FEL amplifier at the TESLA test facility at DESY," Nucl. Instr. Meth. "A", 483, 1-2, pp. 412-417 (May 2002)
- A.H. Lumpkin et. al., "Evidence for Microbunching 'Sidebands' in a Saturated Free-Electron Laser Using Coherent Optical Transition Radiation," Phys. Rev. Lett. **88**, 234801 (2002)
- J.W. Lewellen, "Ion Tracking in Photocathode RF Guns," Phys. Rev. ST Accel. Beams 5, 020101 (2002)
- S.V. Milton et al, "Measurements of Exponential Gain and Saturation of SASE at the APS LEUTL," (invited) Proceedings of the 2001 Particle Accelerator Conference, pp. 236-240
- A. Grelick et al, "The High Power S-Band Feed Subsystem for the Advanced Photon Source (APS) Injector Test Stand," Proceedings of the 2001 Particle Accelerator Conference, pp. 1393-1395
- K. Beczek and J.W. Lewellen, "A Versatile Method of Beamline Construction," Proceedings of the 2001 Particle Accelerator Conference, pp. 1462-1464
- K. Beczek et al, "A Rationalized Approach to Thermionic RF Gun Design," Proceedings of the 2001 Particle Accelerator Conference, pp. 2206-2208
- J.W. Lewellen et al, "The Advanced Photon Source Injector Test Stand," Proceedings of the 2001 Particle Accelerator Conference, pp. 2212-2214
- J.W. Lewellen and M. Borland, "Emittance Measurements of the Advanced Photon Source Photocathode RF Gun," Proceedings of the 2001 Particle Accelerator Conference, pp. 2215-2217
- A.H. Lumpkin et al, "Investigations of Electron-Beam Microbunching and Beam Coalignment Using CTR in a High-Gain SASE FEL," Proceedings of the 2001 Particle Accelerator Conference, pp. 550-552
- M. Borland and J.W. Lewellen, "Initial Characterization of Coherent Synchrotron Radiation Effects in the Advanced Photon Source Bunch Compressor," Proceedings of the 2001 Particle Accelerator Conference, pp. 2839-2841
- E. Lessner and J.W. Lewellen, "An Emittance Algorithm for a High-Intensity Low-Emittance Beam," Proceedings of the 2001 Particle Accelerator Conference, pp. 2842-2844
- S.G. Biedron et al., "A Possible Experiment at LEUTL to Characterize Surface Roughness Wakefield Effects," Proceedings of the 19th Advanced ICFA Beam Dynamics Workshop, CP581, Physics of, and Science with, the X-Ray Free-Electron Laser, pp. 118-123 (2001).
- S.V. Milton et al., "Exponential Gain and Saturation of a Self-Amplified Spontaneous Emission Free-Electron Laser," Science, vol. 292, Issue 5524, 2037-2041, June 15, 2001. Published online 17 May 2001 in Science Express; 10.1126/science.1059955

- J.W. Lewellen, "Higher-order mode RF Guns," Phys. Rev Special Topics – Accelerators & Beams, vol. 4, 040101 (April 2001).
- G. Travish et al., "High-Brightness Beams from a Light Source Injector: The Advanced Photon Source Low-Energy Undulator Test Line LINAC," presented at LINAC 2000, Monterey, CA
- M. Borland et al., "A Highly Flexible Bunch Compressor for the APS LEUTL FEL," presented at LINAC 2000, Monterey, CA
- S.V. Milton et al., "Observation and Analysis of Self-Amplified Spontaneous Emission at the APS," presented at the 2000 FEL conference, Durham, NC; to be published in Nucl. Instr. Methods.
- A.H. Lumpkin et al., "Utilization of CTR to Measure Evolution of Electron Beam Microbunching in a SASE FEL," presented at the 2000 FEL conference, Durham, NC
- S.V. Milton et al., "Observation of Self-Amplified Spontaneous Emission and Exponential Growth at 530 nm," Phys. Rev. Lett., vol. 85, issue 5, pp.988-991 (July 2000)
- A.H. Lumpkin et al., "Electron Beam Bunch Length Characterizations Using Incoherent and Coherent Transition Radiation on the APS SASE FEL Project," Nucl. Instrum. Methods A, vol. 445, issue 1-3, pp. 356-361 (May 2000) (Conference paper, presented at FEL '99)
- S.V. Milton et al., "The APS SASE FEL: Status and Commissioning Results," Proc. 1999 Particle Acc. Conf., vol. 4, pp. 2483-2485. (1999)
- A.H. Lumpkin et al., "High-Brightness Beam Diagnostics for the APS Linac," Proc. 1999 Particle Acc. Conf., vol. 3, pp. 2134-2136 (1999)
- J.W. Lewellen et al., "Operation of the APS RF Gun," Proc of the XIX International Linac Conference, pp. 863-865 (1999)
- J.W. Lewellen et al., "A Hot-Spare Injector for the APS Linac," Proc. 1999 Particle Acc. Conf, vol. 3, pp. 1979-1981 (1999)
- S.G. Biedron et al., "The Operation of the BNL/ATF Gun-IV Photocathode RF Gun at the Advanced Photon Source," Proc. 1999 Particle Acc. Conf., pp. 2024-2026 (1999)
- S.V. Milton et al., "The FEL Development at the Advanced Photon Source," Proc. SPIE – Int. Soc. Opt. Eng (Free-Electron Laser Challenges II) pp. 86-95 (1999)
- A.H. Lumpkin et al., "Optical Techniques for Electron-Beam Characterizations on the APS SASE FEL Project," Nucl. Instrum. Methods A, vol 429, pp. 336-340 (1999)
- S.V. Milton et al., "Status of the Advanced Photon Source Low-Energy Undulator Test Line," Nucl. Instrum. Methods A, vol. 407, pp. 210-214 (1998)
- J.W. Lewellen and S.V. Milton, "Preliminary Calculations of Ballistic Bunch Compression with Thermionic Cathode RF Guns," Proc. SPIE – Int. Soc. Opt. Eng (Coherent Electron Beam X-Ray Sources: Techniques and Applications) vol. 3154, pp. 162-171 (1997)
- J.W. Lewellen et al., "A subcompact free-electron laser," Proc. SPIE – Int. Soc. Opt. Eng. (Electron-Beam Sources and Charged-Particle Optics) vol. 2522 p. 442-50 (1995)
- Y-C. Huang et al., "Electron beam characterization for a compact far-infrad free-electron laser," IEEE Journal of Quantum Electronics, vol. 21, no. 9, pp. 1637-41 (1995)
- J.F. Schmerge et al., "The free-electron laser as a laboratory instrument," IEEE Journal of Quantum Electronics, vol. 31, no. 6, pp. 1166-71 (1995)
- J.W. Lewellen et al., "Preliminary emission characteristic measurements for a $300k FIR FEL", Nucl. Instr. Meth. Phys. Res. A, vol. 358, no. 1-3 p. 24-6 (1995)
- J.F. Schmerge et al., "High efficiency FEL operation using microwave re-acceleration in a combined accelerator/wiggler," Proc. SPIE – Int. Soc. Opt. Eng (Gas, Metal Vapor,

and Free-Electron Lasers and Applications) vol. 2118, p. 125-34 (1994)

- Y-C. Huang et al., "A staggered-array wiggler for far-infrared, free-electron laser operation," IEEE Journal of Quantum Electronics, vol. 30, no. 5, pp. 1289-94 (1994)
- J.F. Schmerge et al., "An accelerator/wiggler for high-efficiency FEL operation," Nucl. Instr. Meth. Phys. Res. A, vol. 341, no. 1-3, pp. 335-40 (1994)
- J.F. Schmerge et al., "High efficiency FEL using microwave reacceleration," Nucl. Instr. Meth. Phys. Res. A, vol. 331, no. 1-3, pp. 558-65 (1993)
- C.D. Demaria et al, "Fingering of the solid-liquid ^{4}He interface in two-dimensions," Journal of Low Temperature Physics, vol. 89, no. 1-2, p. 385-90 (1992)